



# NOvA Experiment Status

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All Experimenter's Meeting February 17, 2014

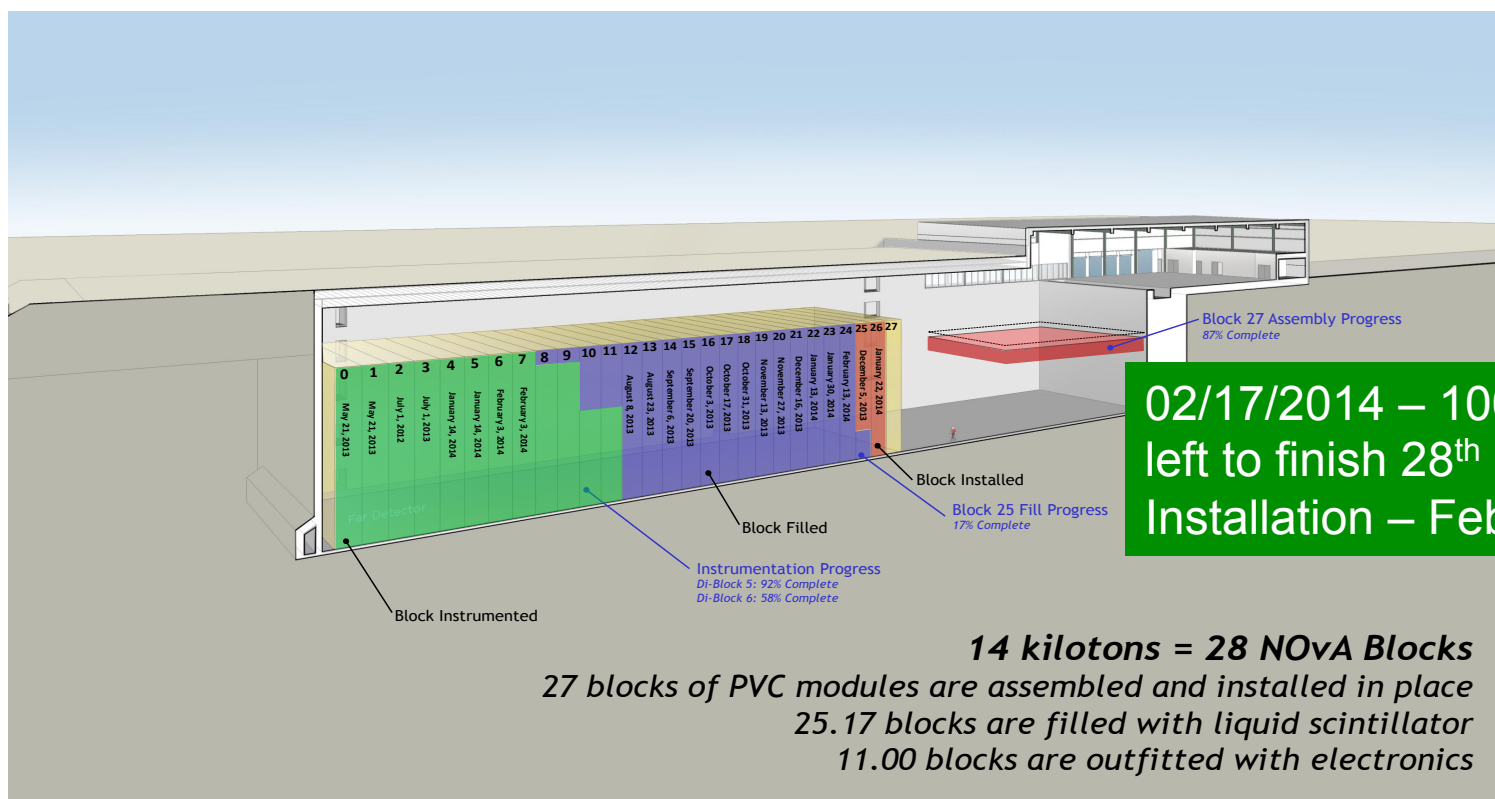
# Detector Assembly Progress



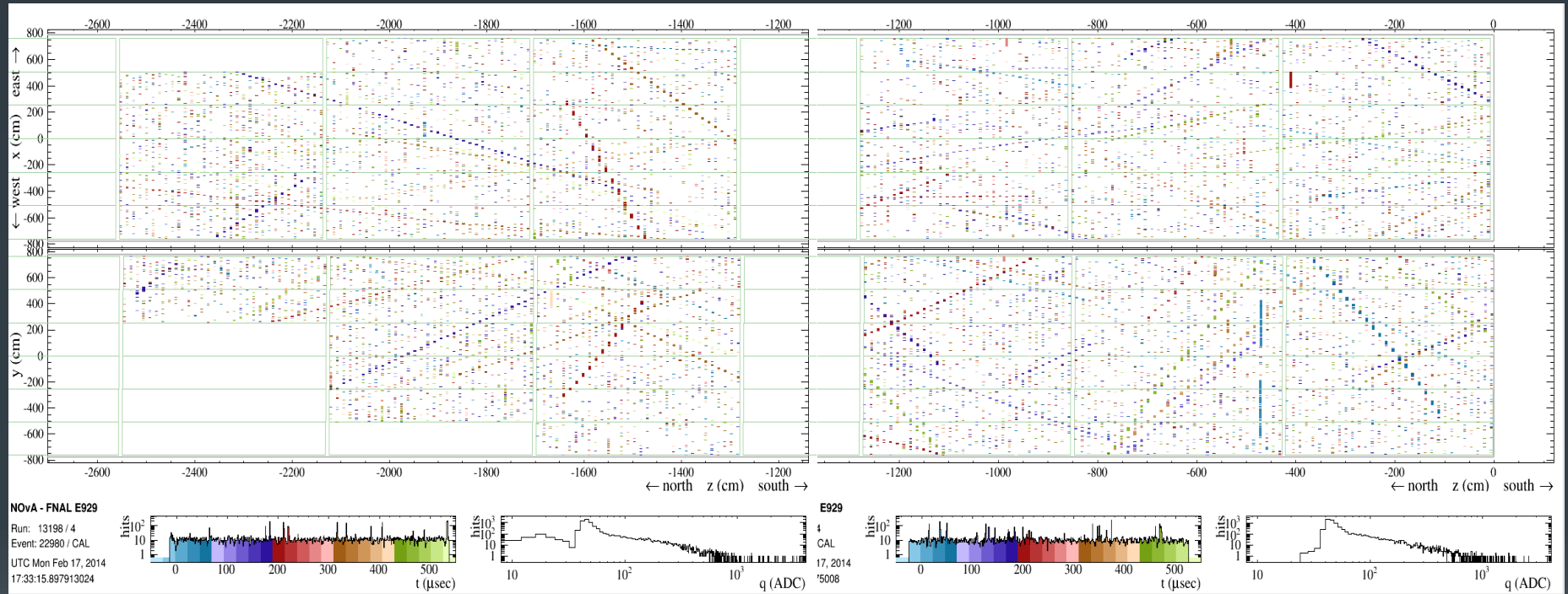
The Intensity Frontier

## NOvA Far Detector Assembly Progress

Status Date: 17FEB14



# Far Detector Data-Taking



Partition 2 – diblocks 4,5,6

Diblocks 4,5(top) cold APDs

Installing APDs on diblocks 5(side),6

First runs for new APDs

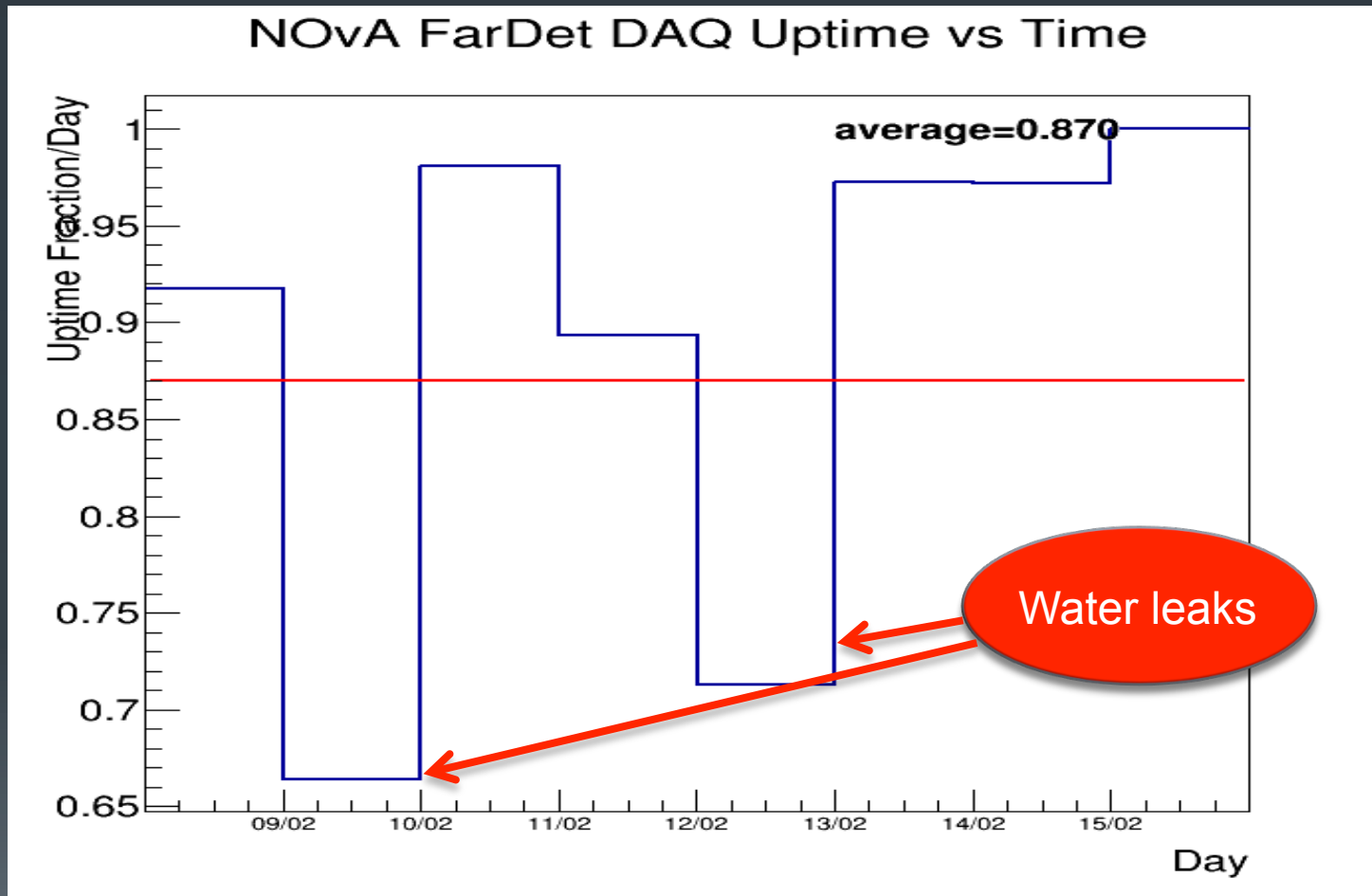
Partition 1 – diblocks 1,2,3

Running with >99% active, cooled APDs

HV at full gain values

Partition 3 running diblocks 7-11 (Front End Boards only) on Night Shift

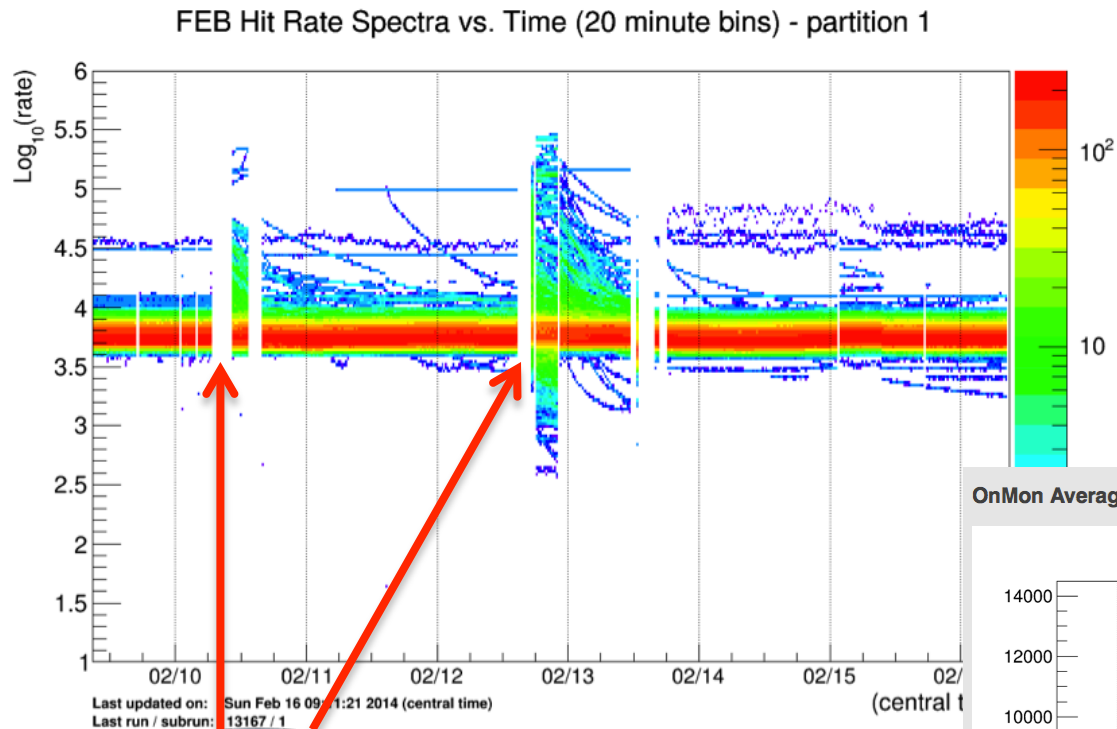
# DAQ Uptime – Partition 1



- Plot for past week
- Average of ~87% for past week (>90% without water leaks)
- Stable running on Partition 1 (stable part of detector)

# Hit Rates in Partition 1 – Past Week

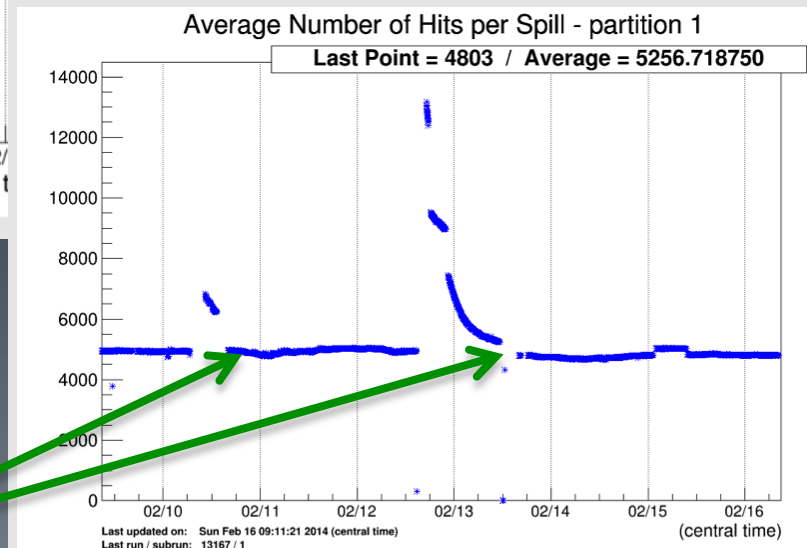
OnMon FEB Hit Rate Spectra vs. Time



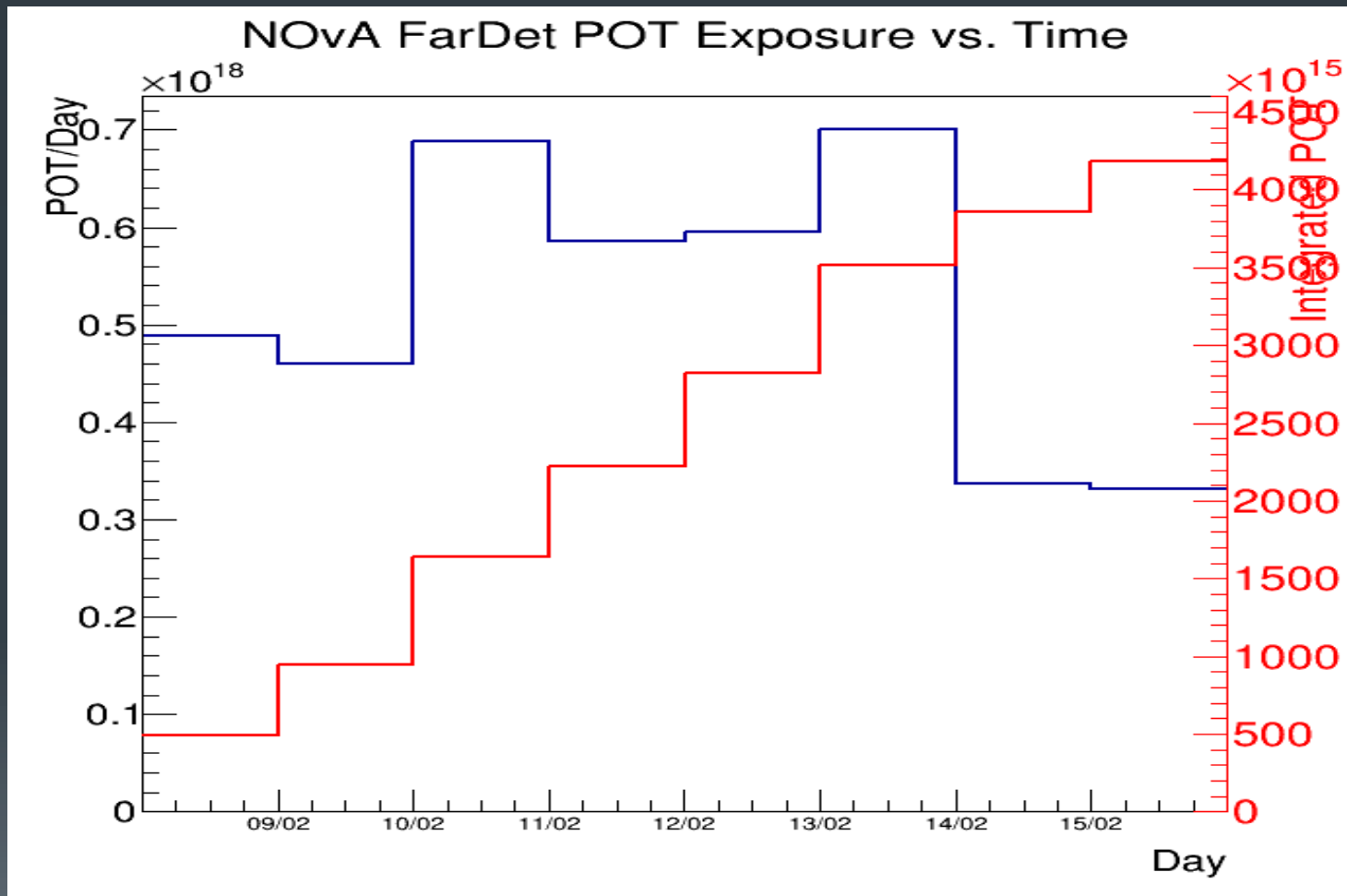
Water leaks

+ Recovery

OnMon Average Number of Hits per Spill



# Fraction of POTs Recorded – P1



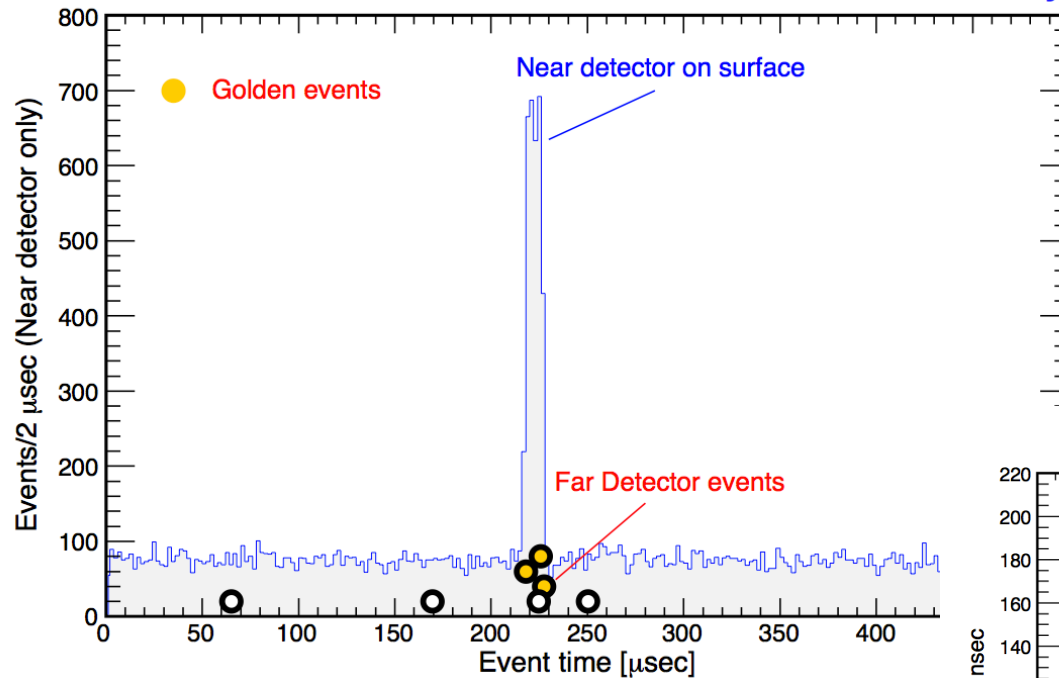
- Averaged ~87% for past week
- Stable running of stable partition
- Recorded  $\sim 4.2E18$  POTs out of  $4.8E18$  delivered

# Neutrinos in the FarDet

- Two approaches were devised to search for neutrino interactions in the FarDet – Hand-scanning of selected events and an automated analysis-based selection
- Both used similar pre-selection cuts to define interesting candidate events
  - Activity cut
  - Fiducial cut
  - Angle cut
- Hand-scanning using strict rules on candidates chosen by pre-selection cuts
  - Blind to event time
  - Final selections display topologies consistent with neutrino interactions
  - ~3 months of data ->  $6.06E19$  POT
- Analysis-based selection
  - Pre-selection cuts + leading-shower analysis
  - Blind to event time
  - Event ID analysis yields high probability to be a neutrino interaction
  - ~ $2.5E19$  POT

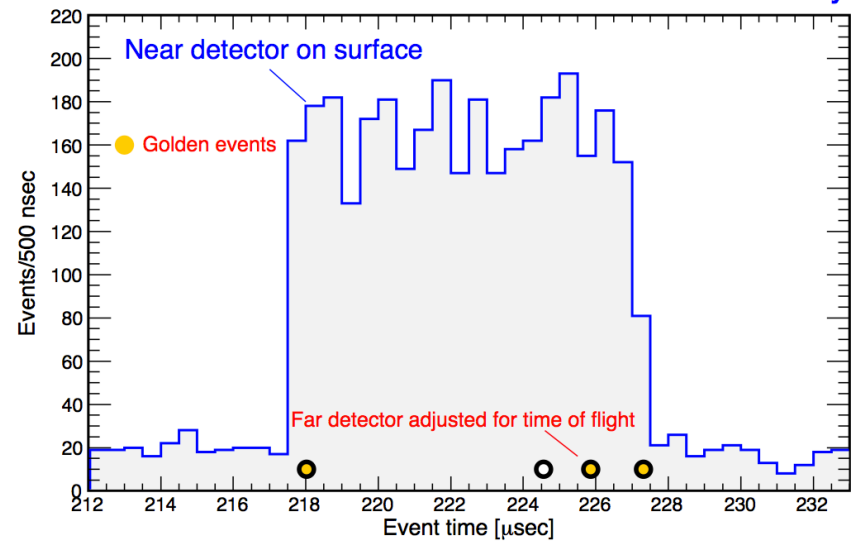
# Timing Comparison to NDOS

NOvA Preliminary



Zoom on  $\sim 10 \mu$ sec  
NUMI spill time

NOvA Preliminary



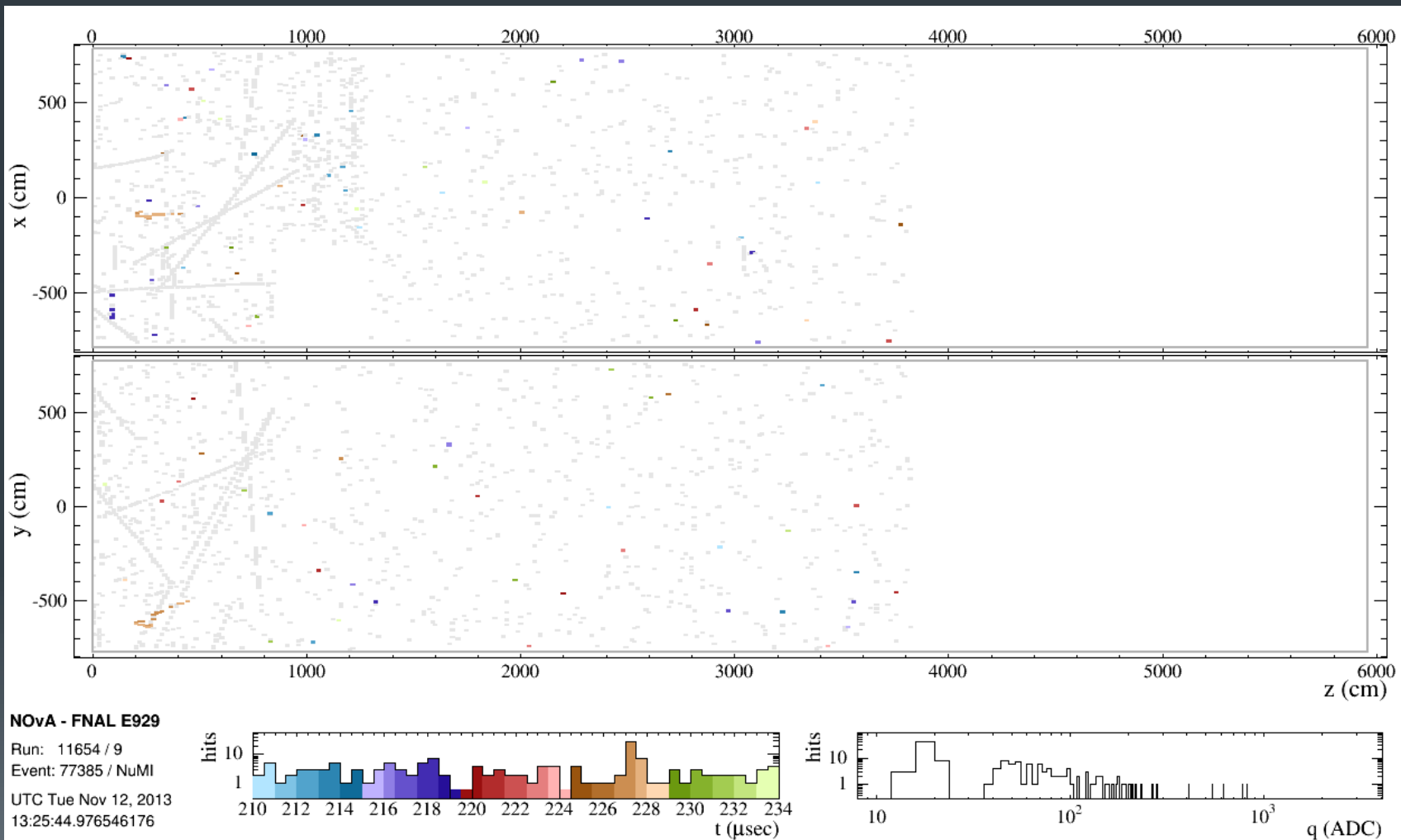
“Golden events”

-> Topologies consistent with neutrino events in the FarDet

Open circles – events found using automated analysis method

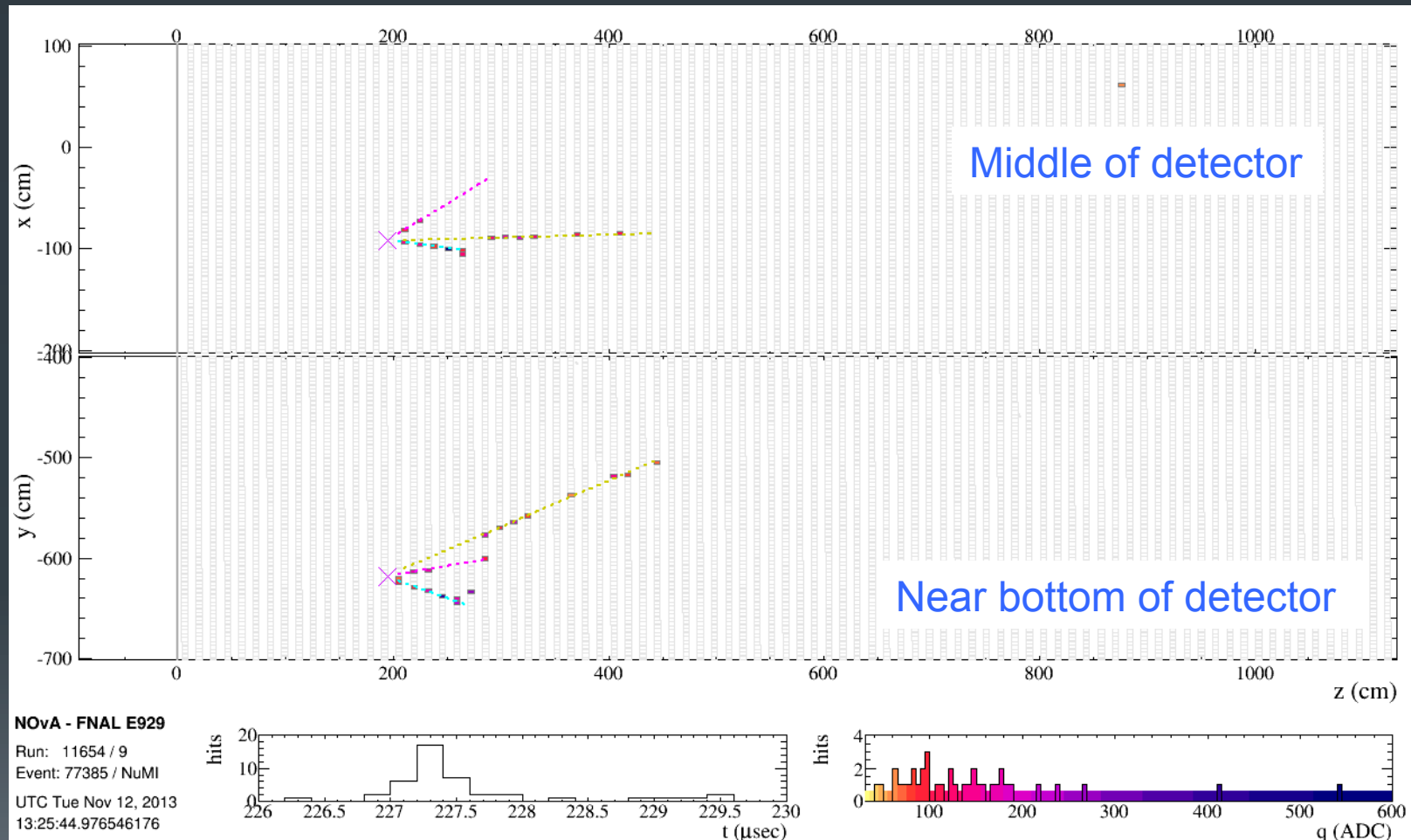


# Event Displays of Neutrinos in FarDet



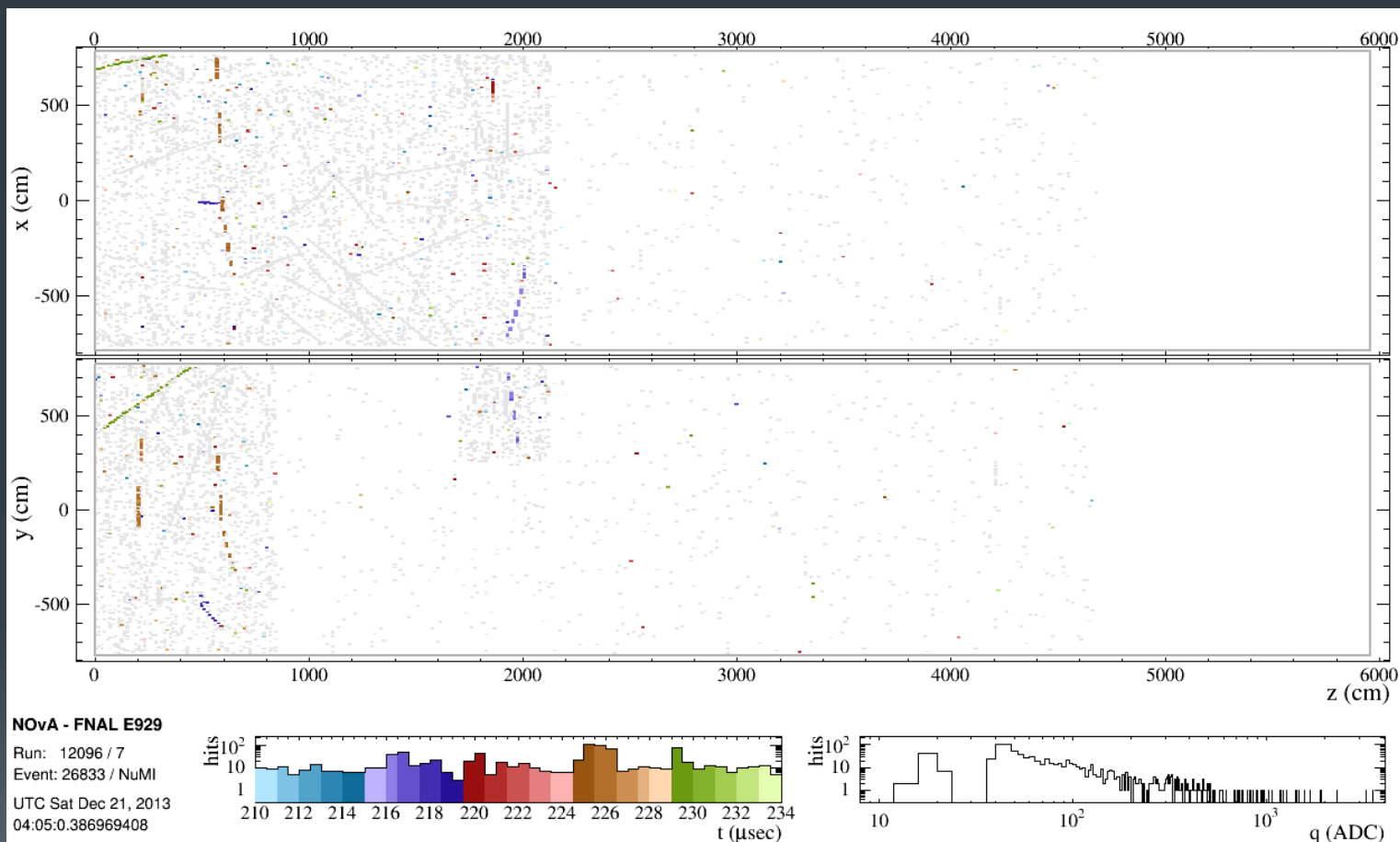
Event found by both Hand-scanning and automated analysis methods  
Hits colored by time  $\rightarrow$  tan-colored hits at  $\sim 227 \mu\text{sec}$

# Event zoomed and reconstructed



Hits now colored by ADC counts  
Reconstruction of vertex and 3 tracks  
NC event?

# Another “Golden Event”

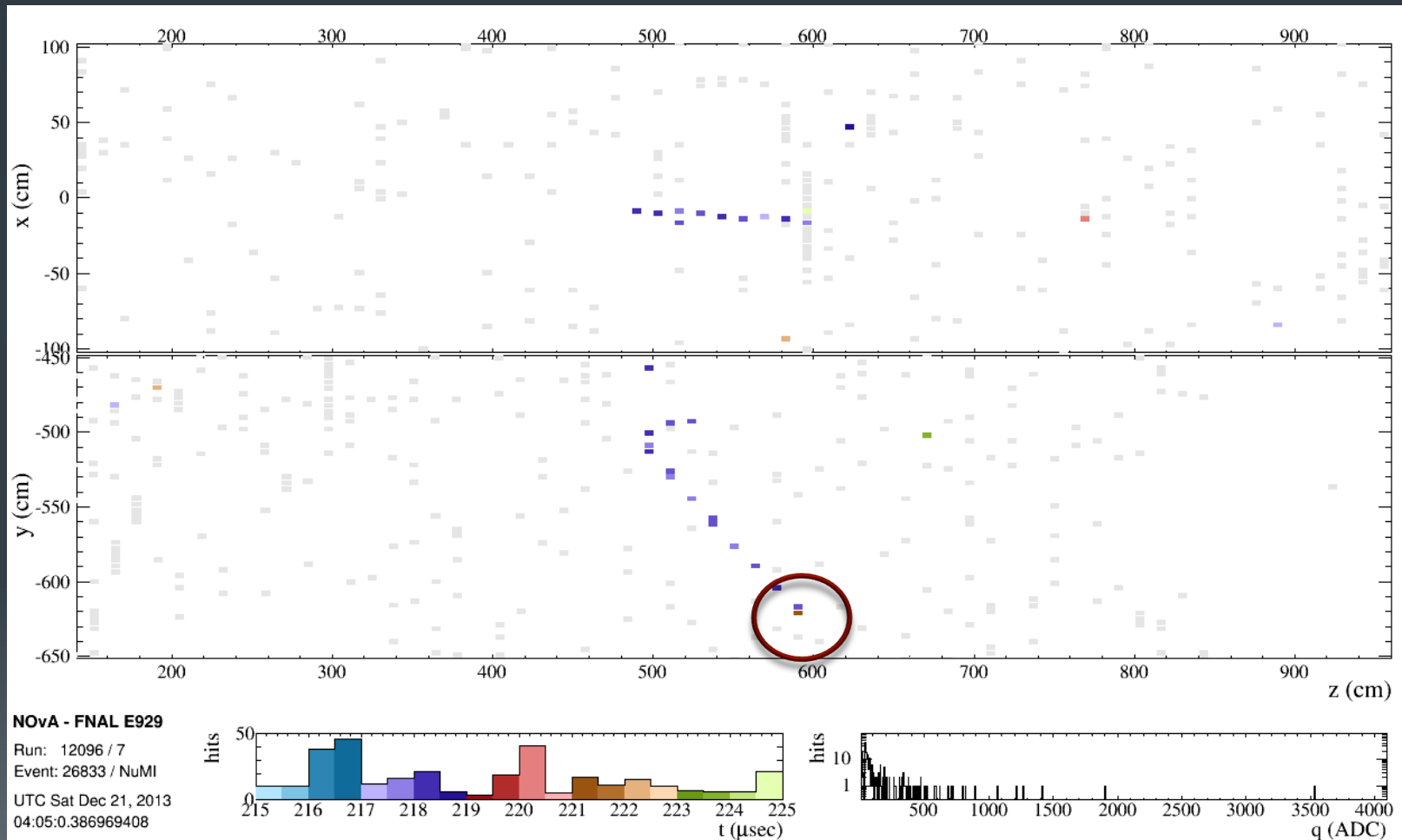


Neutrino event selected by Hand-scanning method

Total trigger timing window arbitrarily set at 550 μsec -> grey hits from full trigger timing window

Neutrino event + cosmuics in ~24 μsec window as shown

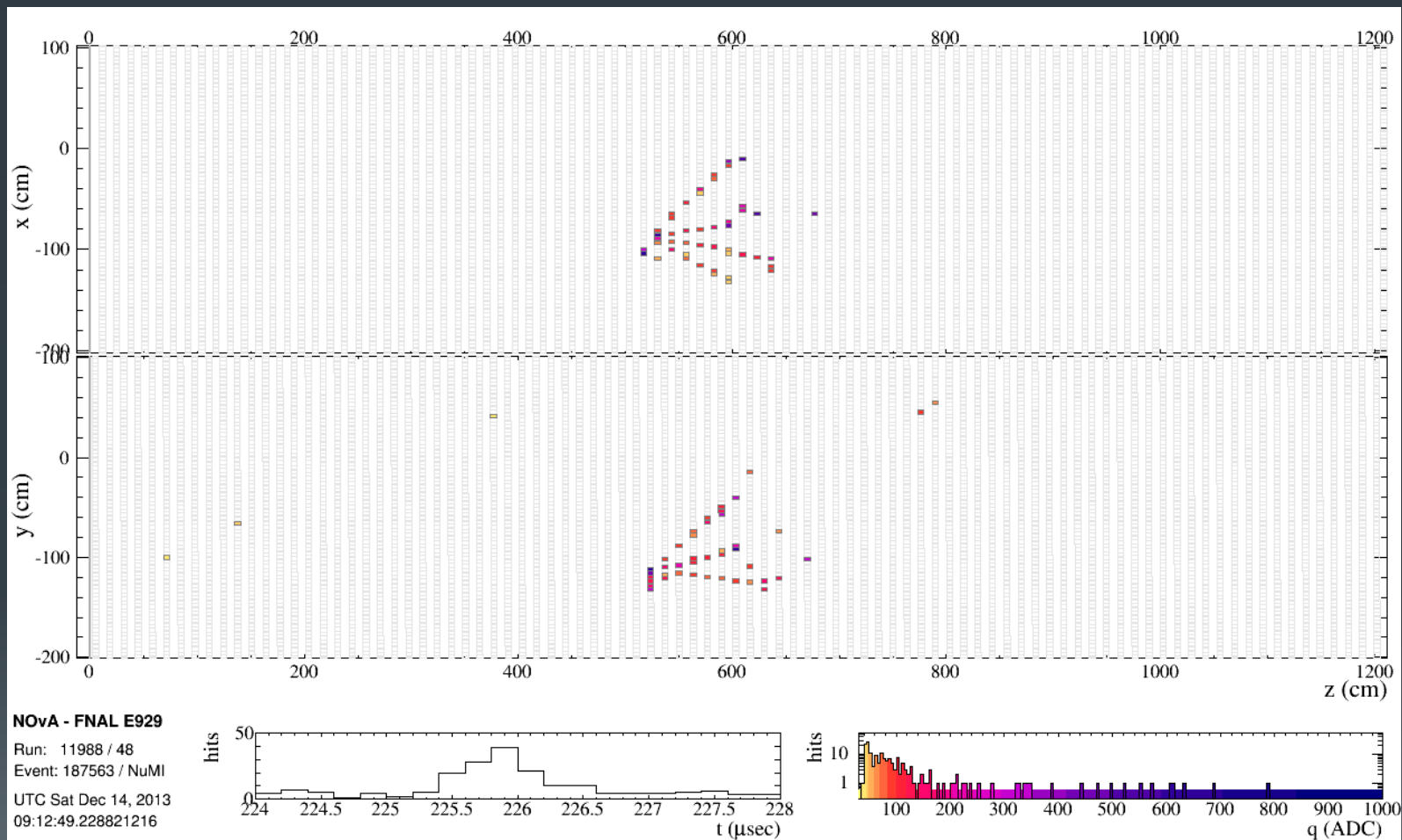
# Zoom on selected event



$\nu_\mu$  CC event?

Note – last hit on long track  $\sim 2 \mu\text{sec}$  later than track

# Multi-Track Event



Neutrino event selected by automated analysis method  
Neutrino event in  $\sim 4 \mu\text{sec}$  window as shown  
NC neutrino event?

# Summary



- Neutrino events found in Far Detector!